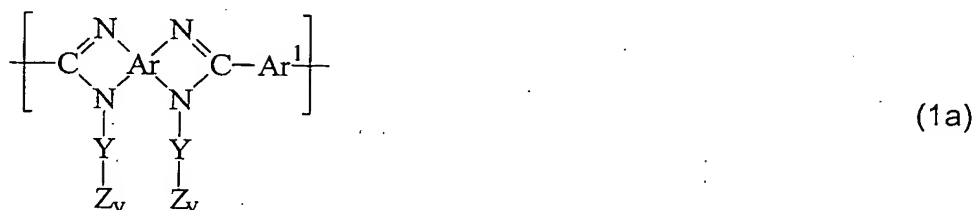


Claims:

1. A functionalized polyazole comprising recurring imidazole units of the general formula

5



and/or



and/ or



and/or



where the radicals Ar, Ar¹ and Ar² are tetravalent, divalent or trivalent aromatic or heteroaromatic groups,

Y is a bond or a group having from 1 to 20 carbon atoms,

v is an integer from 1 to 10 and

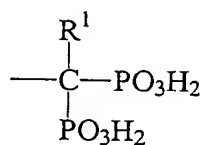
Z is a group of the general formula



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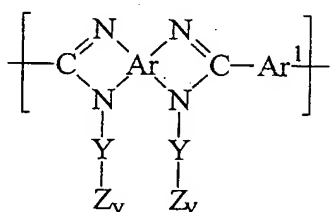
or



(4),

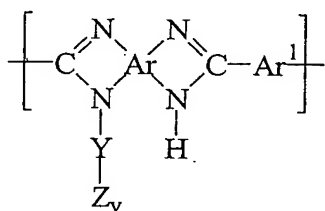
where R^1 and R^2 are each, independently of one another, a hydrogen atom or a group having from 1 to 20 carbon atoms, characterized in that the polyazole is soluble in organic solvents.

- 5 2. A functionalized polyazole comprising recurring imidazole units of the general formula



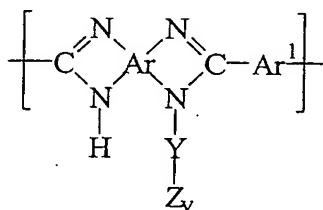
(1a)

and/or



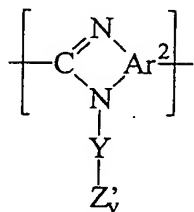
(1b)

and/or



(1c)

and/or



(2'),

where the radicals Ar, Ar^1 and Ar^2 are tetravalent, divalent or trivalent aromatic or heteroaromatic groups,

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Y is a bond or a group having from 1 to 20 carbon atoms,

v is an integer from 1 to 10 and

Z' is a group of the general formula

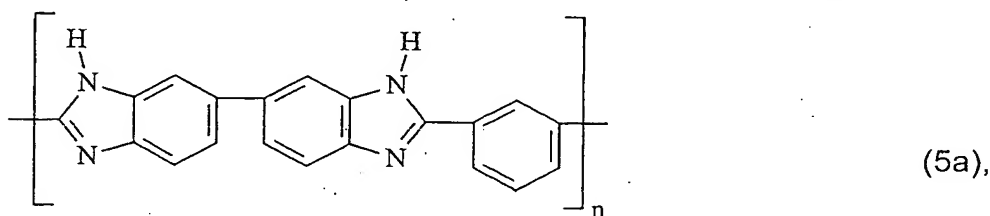


Or



where R^1 and R^2 are each, independently of one another, a hydrogen atom or a group having from 1 to 20 carbon atoms and R^6 and R^7 are each, independently of one another, a group having from 1 to 20 carbon atoms.

3. The polyazole as claimed in claim 1 or 2, characterized in that the polymer comprises recurring benzimidazole units of the formula (5a):



where n is an integer greater than or equal to 10.

4. The polyazole as claimed in one or more of the preceding claims, characterized in that it is doped with an acid.
5. The polyazole as claimed in claim 4, characterized in that the degree of doping is from 3 to 15.
6. The polyazole as claimed in one or more of the preceding claims, characterized in that the group Y is a radical having 1 or 2 carbon atoms.
7. The polyazole as claimed in one or more of the preceding claims, characterized in that it has a molar ratio of phosphorus to nitrogen, P/N, in the range from 0.02 to 0.5.

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8. A process for preparing functionalized polyazoles as claimed in one or more of claims 2 to 7, characterized in that

A) a polymer comprising recurring imidazole units of the general formula



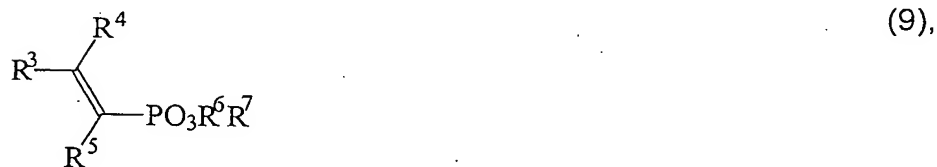
and/or



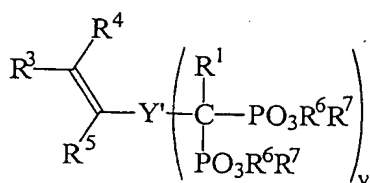
5

is dissolved in a solvent,

- B) this solution is reacted with a base and deprotonated in this way,
C) the solution from step B) is reacted with at least one phosphonate of the general formulae



and/or

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(11),

where R^3 , R^4 and R^5 are each, independently of one another, a hydrogen atom or a group having from 1 to 20 carbon atoms,

R^6 and R^7 are each, independently of one another, a group having from 1 to 20 carbon atoms,

X is a leaving group and

Y' is a bond or a group having from 1 to 20 carbon atoms.

9. The process as claimed in claim 8 for preparing functionalized polyazoles as claimed in one or more of claims 1 and 3 to 7, characterized in that the solution resulting from C) is acidified with an acid.
10. The process as claimed in any of the preceding claims, characterized in that a base having a pK_B of less than 7, preferably less than 6, in particular less than 5, is used in step A).
11. The process as claimed in any of the preceding claims, characterized in that phosphonates of the general formulae



where m is an integer from 0 to 11 and the radicals X, R^6 and R^7 are as defined above, is used as phosphonate in step B).

12. A polyazole obtainable by a process as claimed in claim 9.
13. A polymer electrolyte membrane coated with polyazoles as claimed in at least one of claims 1 to 7 and 12.
14. A polymer electrolyte membrane comprising polyazoles as claimed in at least one of claims 1 to 7 and 12.
15. A membrane-electrode unit comprising a polymer electrolyte membrane as claimed in claim 13 or 14.

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16. A membrane-electrode unit comprising ionomers based on polyazoles as claimed in at least one of claims 1 to 7 and 12.
17. A fuel cell comprising a membrane-electrode unit as claimed in claim 15 or 16.